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Date: **November 18, 2011**

To: **Amy Wolff, Durham City County Planning Department**
From: **Bill Judge PE, City of Durham Department of Transportation**
Subject: **Gateway Terrace (Z1100020) Traffic Impact Analysis**

The Unified Development Ordinance (UDO) requires that a Traffic Impact Analysis (TIA) be prepared for proposed developments estimated to generate 150 or more peak hour vehicle trips. The proposed development, Gateway Terrace, includes 36,000 of retail (shopping center) and two fast-food restaurants (each approximately 4,500 square feet with drive-up windows). The development is expected to generate 528 a.m. peak hour trips (277 entering and 251 exiting) and 517 p.m. peak hour trips (263 entering and 254 exiting). The proposed development is located on the north side of Watkins Road west of Southwest Durham Drive. The expected completion year is 2013, and the TIA analysis year is 2014. The Gateway Terrace TIA was prepared by Kimley-Horn and Associates, Inc. in August 2011.

Study Area
The study area includes the following intersections:

- US 15-501 and Mt. Moriah Road;
- US 15-501 and Southwest Durham Drive;
- Mt. Moriah Road and McFarland Drive / Ladle Drive;
- Southwest Durham Drive and Witherspoon Drive;
- Witherspoon Drive and Watkins Road;
- Witherspoon Drive and Kroger Driveway;
- Watkins Road and Site Driveway 1; and
- Watkins Road and Site Driveway 2 / Honeycutt Drive.

Trip Generation
Trip generation numbers are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 8th *Edition*, 2008. The TIA included the following ITE trip adjustments:

- 49% of the a.m. peak hour site fast-food restaurant trips will be pass-by trips from the adjacent roadways;
- 50% of the p.m. peak hour site fast-food restaurant trips will be pass-by trips from the adjacent roadways; and
- 30% of the p.m. peak hour shopping center trips will be pass-by trips from the adjacent roadways.

The TIA trip generation estimate is shown in the table below:

ITE Land Use (Code)	Size	a.m. Peak Hour (vph)			p.m. Peak Hour (vph)		
		Enter	Exit	Total	Enter	Exit	Total
Shopping Center (820)	36,000 SF	51	33	84	104	108	212
Fast-Food With Drive-Through (934)	9,000 SF	226	218	444	159	146	305
Total Site Trips		**277**	**251**	**528**	**263**	**254**	**517**
Pass-By Trips		-111	-107	-218	-111	-105	-216
External (New) Trips		**166**	**144**	**310**	**152**	**149**	**301**

Traffic Data Collection
The peak hour intersection turning movement counts were taken from 7-9 a.m. and 4-6 p.m. in July 2011.

Trip Distribution and Assignment
The assignment of site traffic on the study area roadway network was based on the following trip distribution percentages:

- To/From the West via US 15-501: 35% of site trips;
- To/From the East via US 15-501: 30% of site trips;
- To/From the North via Mt. Moriah Road: 9% of site trips;
- To/From the South via Mt. Moriah Road: 8% of site trips;
- To/From the South via Southwest Durham Drive: 8% of site trips; and
- To/From Patterson Place Development: 10% of site trips.

Approved Developments and Background Growth
Approved development traffic is traffic generated by specific approved, but not yet constructed, projects within the vicinity of the subject project. In addition to the one-half percent (0.5%) annual growth rate for background traffic volumes, the anticipated traffic from the following approved developments were included in the TIA:

- 5,782 SF High Turnover Sit Down Restaurant located within Patterson Place Phase 2; and
- 19,546 SF Specialty Retail located within Patterson Place Phase 2.

TIP Roadway Improvements
There are no significant scheduled transportation improvement projects in the study area vicinity.

Capacity Analysis

Capacity analyses were performed using the a.m. and p.m. peak hours for the following scenarios:

- Existing (2011) conditions;
- No-Build (2014) conditions (2011 Existing + Background growth traffic); and
- Build (2014) conditions (2011 Existing + Background growth traffic + Site traffic).

This development and project study area are located within the Suburban Tier where the adopted LOS standard is LOS D. The following table summarizes the average delay for the various Levels of Service (LOS) for unsignalized and signalized intersections:

	Signalized Intersections	**Unsignalized Intersections**
Level of Service	**Average Vehicle Delay (Seconds)**	**Average Vehicle Delay (Seconds)**
A	**0-10**	**0-10**
B	**10-20**	**10-15**
C	**20-35**	**15-25**
D	**35-55**	**25-35**
E	**55-80**	**35-50**
F	**>80**	**>50**

US 15-501 and Mt. Moriah Road

The following table summarizes the Levels of Service at this existing signalized intersection:

Scenario	**a.m. LOS**	**p.m. LOS**
Existing (2011)	**C**	**D**
No-Build (2014)	**C**	**D**
Build (2014)	**C**	**D**

The intersection currently operates at a LOS C during the a.m. peak hour and a LOS D during the p.m. peak hour. With the additional site traffic, the delays will increase slightly, but the intersection will remain at an acceptable LOS D or better for both peak hours. No roadway improvements are required to address the site traffic impacts.

US 15-501 and Southwest Durham Drive

The following table summarizes the Levels of Service at this existing signalized intersection:

Scenario	**a.m. LOS**	**p.m. LOS**
Existing (2011)	**B**	**B**
No-Build (2014)	**B**	**B**
Build (2014)	**B**	**B**

The intersection currently operates at a LOS B during both the a.m. and p.m. peak hour. With the additional site traffic, the delays will increase slightly, but the intersection will remain at an acceptable LOS B for both peak hours. No roadway improvements are required to address the site traffic impacts.

Mt. Moriah Road and McFarland Drive / Ladle Drive

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Existing (2011)	**C***	**F***
No-Build (2014)	**C***	**F***
Build (2014)	**E***	**F***

* Unsignalized operation, with LOS reported for the worst (EB) approach

The existing eastbound approach (Ladle Drive) operates at a LOS C in the a.m. peak hour and LOS F in the p.m. peak hour for the Existing (2011) condition and the No-Build (2014) condition. With the additional site traffic, the eastbound approach (Ladle Drive) will decrease to a LOS E in the a.m peak hour and a LOS F in the p.m. peak hour for the Build (2014) condition. Although a LOS F is undesirable at signalized intersections, a LOS F is typical at many unsignalized intersections and driveways during the peak hours until such time a traffic signal is warranted since nearly all of the anticipated delay is confined to the side street approach. Given the low side street volumes and proximity of the intersection to the existing traffic signal at US 15-501 and Mt. Moriah Road, a traffic signal is not warranted or appropriate at this intersection. No roadway improvements are required to address the site traffic impacts.

Southwest Durham Drive and Witherspoon Drive

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Existing (2011)	**B***	**B***
No-Build (2014)	**B***	**B***
Build (2014)	**B***	**D***

* Unsignalized operation, with LOS reported for the worst (NB) approach

The existing northbound approach (Witherspoon Drive) operates at a LOS B in both the a.m. and the p.m. peak hour for the Existing (2011) condition and the No-Build (2014) condition. With the additional site traffic, the northbound approach (Witherspoon Drive) will remain at an acceptable LOS D or better for both peak hours. No roadway improvements are required to address the site traffic impacts.

Witherspoon Drive and Watkins Road

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Existing (2011)	**A***	**A***
No-Build (2014)	**A***	**A***
Build (2014)	**A***	**B***

* Unsignalized operation, with LOS reported for the worst (EB) approach

The existing eastbound approach (Watkins Road) operates at a LOS A in both the a.m. and the p.m. peak hour for the Existing (2011) condition and the No-Build (2014) condition. With the additional site traffic, the eastbound approach (Watkins Road) will remain at an acceptable LOS B or better for both peak hours. No roadway improvements are required to address the site traffic impacts.

Witherspoon Drive and Kroger Driveway

The following table summarizes the Levels of Service at this existing unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Existing (2011)	**A***	**B***
No-Build (2014)	**A***	**B***
Build (2014)	**A***	**B***

* Unsignalized operation, with LOS reported for the worst (WB) approach

The existing westbound approach (Kroger Driveway) operates at a LOS A in the a.m. peak hour and a LOS B in the p.m. peak hour for the Existing (2011) condition and the No-Build (2014) condition. With the additional site traffic, the westbound approach (Kroger Driveway) will remain at an acceptable LOS B or better for both peak hours. No roadway improvements are required to address the site traffic impacts.

Watkins Road and Site Driveway 1

The following table summarizes the Levels of Service at this proposed unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Build (2014)	**B***	**B***

* Unsignalized operation, with LOS reported for the worst (SB) approach

The southbound approach on Site Driveway #1 would operate at an acceptable LOS B during both the a.m. and p.m. peak hour with site traffic and the following recommended improvement:

- Construct Site Driveway #1 with one ingress lane and one egress lane with an appropriate internal tangent throat distance.

Watkins Road and Site Driveway 2

The following table summarizes the Levels of Service at this proposed unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Build (2014)	**B***	**B***

* Unsignalized operation, with LOS reported for the worst (SB) approach

The southbound approach on Site Driveway #2 would operate at an acceptable LOS B during both the a.m. and p.m. peak hour with site traffic and the following recommended improvement:

- Construct Site Driveway #2 with one ingress lane and one egress lane with an appropriate internal tangent throat distance.

Summary of Required Improvements:

No improvements are proposed or required.